As to the plateau in the north of the Khangai Mountains, it is covered with rich meadows, while the slopes of the hills are clothed with forests of larch; the Siberian cedar-tree also makes its appearance. In the lower valleys the Mongols carry on some agriculture.

The above account is followed by an ethnographical sketch of the Ordos-Mongols and the Daldas.

The results obtained by the expedition are very important. A survey has been made of a stretch of no less than 4400 miles. Latitudes and longitudes have been determined at sixty-nine places. Two hundred photographs, 700 specimens of mammals and birds, a bulky herbarium, and rich collections of lizards, insects, mollusks, and rocks have been brought in. M. Berezovsky still remains in the region he has become so fond of, and he wrote last February, from Hoi-siang, that his journeys about Si-ning and Tai-tchan have enriched his collection with 500 more specimens of birds, some of which are very interesting.

P. A. K.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 17.—"Specific Inductive Capacity." By J. Hopkinson, M.A., D.Sc., F.R.S.

Colza Oil.—This oil has been found not to insulate sufficiently well for a test by the method of my former paper. Most samples, however, were sufficiently insulating for the present method. Seven samples were tested with the following mean results:—

No. 1. This oil was kindly procured direct from Italy for these experiments by Mr. J. C. Field, and was tested as supplied to me—

K = 3·10.

No. 2 was purchased from Mr. Sugg, and tested as supplied—

K = 3·14.

No. 3 was purchased from Messrs. Griffin, and was dried over anhydrous copper sulphate—

K = 3·23.

No. 4 was refined rape oil purchased from Messrs. Pinchin and Johnson, and tested as supplied—

K = 3·08.

No. 5 was the same oil as No. 4, but dried over anhydrous copper sulphate—

K = 3·07.

No. 6 was unrefined rape purchased from Messrs. Pinchin and Johnson, and tested as supplied, the insulation being bad, but still not so bad as to prevent testing—

K = 3·12.

No. 7. The same oil dried over sulphate of copper—

K = 3·09.

Omitting No. 3, which I cannot indeed say of my own knowledge was pure colza oil at all, we may, I think, conclude that the specific inductive capacity of colza oil lies between 3·07 and 3·14.

Prof. Quincke gives 2·385 for the method of attraction between the plates of a condenser, 3·296 for the method of lateral compression of a bubble of gas. Palaz (*La Lumière Électrique*, vol. xxi. 1886, p. 97) gives 3·027.

Olive Oil.—The sample was supplied me by Mr. J. C. Field—

K = 3·15.

The result I obtained by another method in 1880 was 3·16.

Two other oils were supplied to me by Mr. J. C. Field.

Arachide.—K = 3·17.

Sesame.—K = 3·17.

A commercial sample of *raw linseed oil* gave K = 3·37.

Two samples of *castor oil* were tried: one newly purchased gave K = 4·82; the other had been in the laboratory a long time, and was dried over copper sulphate—

K = 4·84.

The result of my earlier experiments for castor oil was 4·78; the result obtained subsequently by Cohen and Arons (*Wiedemann's Annalen*, vol. xxviii. p. 474) is 4·43. Palaz gives 4·610.

Ether.—This substance as purchased, reputed chemically pure, does not insulate sufficiently well for experiment. I placed a sample, purchased from Hopkin and Williams as pure, over quicklime, and then tested it. At first it insulated fairly well, and gave K = 4·75. In the course of a very few minutes K = 4·93, the insulation having declined so that observation was doubtful. After the lapse of a few minutes more observations became impossible. Prof. Quincke in his first paper gives 4·623 and 4 660, and 4·394 in his second paper.

Bisulphide of Carbon.—The sample was purchased from Hopkin and Williams, and tested as it was received—

K = 2·67.

Prof. Quincke finds 2·669 and 2·743 in his first paper, and 2·623 in his second. Palaz gives 2·609.

Amylene.—Purchased from Burgoyne and Company—

K = 2·05.

The refractive (μ) index for line D is 1·3800,

$$\mu^2 = 1{\cdot}9044.$$

Of the benzol series four were tested: *benzol, toluol, xylol,* obtained from Hopkin and Williams, *cymol* from Burgoyne and Company.

In the following table the first column gives my own results, the second those of Palaz, the third my own determinations of the refractive index for line D at a temperature of 17°·5 C., and the fourth the square of the refractive index:—

			μ	μ^2.
Benzol	2·38	2·338	1·5038	2·2614
Toluol	2·42	2·365	1·4990	2·2470
Xylol	2·39	—	1·4913	2·2238
Cymol	2·25	—	1·4918	2·2254

For benzol Silow found 2·25, and Quincke finds 2·374.

Linnean Society, November 17.—Prof. St. George Mivart, F.R.S., Vice-President, in the chair.—Mr. A. Bennett drew attention to new British plants, viz. (1) *Arabis alpina*, gathered on the Cuchillin Mountains, Isle of Skye; (2) *Juncus alpina*, obtained in Perthshire; and (3) *Juncus tenuis*, got near Galloway, Kirkcudbrightshire.—Mr. W. H. Beeby made remarks on *Carex cæspitosa* from Shetland.—Photographs of a branched palm (*Borassus flabelliformis*) was shown for Surgeon-General Bidie, of Madras, and a letter thereon read. The tree is growing near Tanjore, at a village named Paducottah, and is remarkable in being divided into eight branches.—Mr. W. Wilson sent for exhibition branches with ripe berries of *Taxus baccata*, and its variety *hybernica*, produced by natural cross-fertilization: these were grown in Central Aberdeenshire.—Mr. T. Christy showed a new species of *Strophanthus* from the Niger; it is distinguished by its brown velvety seed and intensely bitter taste.—Mr. D. Morris exhibited the following specimens: (1) a fibre from Vera Cruz, named Broom Root, which examination showed to be the root fibres of *Epicampus macroura*, known as "Raviz de Zacaton" by the Mexicans, its yearly value in export is £60,000; (2) another Mexican fibre, "Ixtli," much used for nail-brushes, &c., in Britain, by reason of its short tough fibre, is found by the Kew authorities to be derived from *Agave heteracantha*.—Mr. J. G. Baker showed *Lycopodium albidum*, a new species from the Andes of Ecuador; it is allied to *L. clavatum*, but without chlorophyll except at the base. He also showed *Neobaronia xiphoclades*, a new Papilionaceous plant from Madagascar, obtained by the Rev. R. Baron.—A paper was read by Mr. P. Geddes, on certain factors of variation in plants and animals.—Then followed a paper on the Copepoda of Madeira and the Canary Islands, by Mr. I. C. Thompson. In all, sixty-five species were obtained. Of these, six are new to science, and three probably of generic significance. Twenty-three are known in British waters, and of these fourteen belong to the family Harpacticidæ. There is a similarity in species in the different islands, but the numbers of each vary greatly.

Geological Society, November 9.—Prof. J. W. Judd, F.R.S., President, in the chair.—The following communications were read:—Note on the so-called "Soapstone" of Fiji, by Henry B. Brady, F.R.S. The Suva deposit, which has a composition very similar to that of the volcanic muds at present forming around oceanic islands in the Pacific, is friable and easily disintegrated. The colour ranges from nearly white to dark gray, the mass being usually speckled with minerals of a darker hue. Under the microscope the rock presents the character of a fine siliceous mud with crystals of augite, &c.,

together with the sparsely scattered tests of Foraminifera. The approximate chemical composition of typical specimens is:—Silica, 50 per cent.; alumina, 18 per cent.; lime and magnesia, from 5 to 6 per cent.; ferric oxide, from 3 to 8 per cent.; water, 16 per cent., with a small proportion of alkalies, chiefly potash, and but small trace of carbonates. The author's attention was chiefly directed to the common gray friable rocks which may be softened in water and washed on a sieve, the residue consisting mainly of Foraminifera with a few Ostracoda. Of three specimens examined, (1) is a light-gray rock from close to the sea-level; (2) of a lighter colour, from about 100 feet elevation; (3) is nearly white and somewhat harder, and was derived from an intermediate point. So far as the Microzoa are concerned, the first two present no differences which might not be observed in dredgings from the recent sea-bottom, taken at similar depths a little distance apart. The third appears to have been deposited in somewhat deeper water. There is a marked scarcity of arenaceous Foraminifera. Then followed notes on the rarer and more interesting species, together with a list of the ninety-two species of Foraminifera found. Of these, eighty-seven are forms still living in the neighbourhood of the Pacific islands. Two of the remaining five are new to science, and the rest extremely rare. The author concluded that these deposits are of Post-Tertiary age, formed at depths of from 150 to 200 fathoms in the neighbourhood of a volcanic region. The following new or little-known species were selected for illustration:—*Ellipsoidina ellipsoides*, var. *oblonga*, Seguenza; *Haplophragmium rugosum*, D'Orb.; *Ehrenbergina bicornis*, nov.; *Sphæroidina ornata*, nov. The President hoped that this paper might be regarded as one of the first-fruits of travels undertaken by the author for the purpose of investigating the interesting deposits of this nature. Prof. Rupert Jones agreed that this was a valuable instalment of work to be expected. The peculiar Foraminifer specially mentioned by Mr. Brady (*Ellipsoidina ellipsoides*, var. *oblonga*, Seguenza) must have connections, so that, as the author has intimated, the interest attached to it was not yet wholly worked out.—On some results of pressure and of intrusive granite in stratified Palæozoic rocks near Morlaix, in Brittany, by Prof. T. G. Bonney, F.R.S.—On the position of the Obermittweida conglomerate, by Prof. T. McK. Hughes.—On the Obermittweida conglomerate: its composition and alteration, by Prof. T. G. Bonney, F.R.S.—Notes on a part of the Huronian series in the neighbourhood of Sudbury (Canada), by Prof. T. G. Bonney, F.R.S. The specimens noticed by the author were in part collected by him in the summer of 1884, when the Canada Pacific Railway was in process of construction, and in part subsequently supplied to him by the kindness of Dr. Selwyn, Director-General of the Geological Survey of Canada. The eastern edge of the district assigned to the Huronian consists of rocks, which may possibly be part of the Laurentian series modified by pressure. But after crossing a belt of these, barely a mile wide, there is no further room for doubt. All the rocks for many miles are distinctly fragmental, except certain intrusive diabases or diorites. These fragmental rocks are grits, conglomerates, and breccias, which are described as far as about two miles west of Sudbury. The included fragments in these rocks appear to have undergone some alterations subsequent to consolidation: these are described. In some cases the changes appear to be anterior to the formation of the fragments. The matrix also has undergone some change, chiefly the enlargement of quartz grains, and the development or completion of mica-flakes, as in the Obermittweida rock. The author gave some notes on other specimens collected by him along the railway, further west, and on those supplied to him from near Lake Huron by Dr. Selwyn. As a rule these are but little altered. Some contain fragments of igneous rocks, apparently lavas. The author discusses the significance of the changes in these rocks, as bearing on general questions of metamorphism, and states that, in his opinion, the name Huronian, at present, includes either a series of such great thickness that the lower beds are more highly altered than the higher, or else two distinct series; and he inclines to the latter view. Both, however, must be separated from the Laurentian by a great interval of time, and neither exhibits metamorphism comparable with that of a series of schists and gneisses, like the so-called Montalban. The newer reminds him often of the English Pebidians. After the reading of this paper there was a discussion, in which the President, Dr. Geikie, Mr. Rutley, and others took part.

Royal Meteorological Society, November 16.—Mr. W. Ellis, President, in the chair.—The following papers were read:—The use of the spectroscope as a hygrometer simplified and explained, by Mr. F. W. Cory. The object of this paper is to suggest as simple a way as possible of using the spectroscope as a hygrometer in order to facilitate its introduction amongst observers as a standard meteorological instrument. The best form of hygro-spectroscope as a recognized standard for the purpose of investigating and scrutinizing the changes of the three parts of the spectrum mentioned is that originally termed by Mr. Rand Capron "The Rainband Spectroscope." It ought to have a fixed slit, and in addition a milled wheel at the side for the easier adjustment of the focus. The author concludes by giving a set of hints to observers for taking weather observations with a pocket spectroscope.—Rainfall on and around Table Mountain, Cape Town, Cape Colony, by Mr. J. G. Gamble. The author calls attention to the great and in some respects peculiar differences that exist between the quantity of rain that is registered on and around Table Mountain. The most striking feature is the small fall on the signal hill. The signal hill, otherwise called "the Lion's Rump," lies to the west of Cape Town, between it and the Atlantic. The average annual fall there is only 15 inches, while the fall at the western foot is 21 inches, and in Cape Town 27 inches. The signal hill is 1143 feet above the sea. The fall at Platteklip, on the northern slope of Table Mountain, overlooking Cape Town and 550 feet above the sea, is considerable, namely 45 inches. The greatest fall is at Waai Kopje, about half a mile to the southward of the highest point of the mountain, at an elevation of 3100 feet, or 450 feet below the top. Another station on Table Mountain further south—that is, to the leeward in the rainy season—and 2500 feet above sea-level, has only 39 inches. The eastern suburbs, Rondebosch, Newlands, and Wynberg, all have a comparatively abundant rainfall, 40 to 50 inches and upwards, the greater part of which falls in winter time.—On the cause of the diurnal oscillation of the barometer, by Dr. R. Lawson. The object of this paper is to show that the durnal oscillation of the barometer is mainly due to the combination of the earth's rotation with its orbital motion.

PARIS.

Academy of Sciences, November 28.—M. Janssen in the chair.—On the most general equations of double refraction compatible with Fresnel's wave surface, by M. Maurice Lévy. Whatever view be taken of polarized light in a plane, whether it be regarded as the effect of an elastic or electro-magnetic disturbance, whether it result from rectilinear vibrations or from mean rotations (vortices), or from any other cause, it is certain, as remarked by Maxwell, that this cause is measurable by a quantity which is in the nature of a vector. This vector, whether it be a vibration or a force, the axis of a vortex or of a magnetic momentum, or aught else, is here called a luminous vector, and an attempt is made to determine its most general expression compatible with Fresnel's wave surface.—On the movement of cirri and their relations to cyclones, by M. H. Faye. These phenomena are compared to the action of a river on which floating ice is borne along. Whenever an eddy is formed, the nearest fragments of ice are seen to be drawn within its influence, following its spiral movements and disappearing with it on reaching the centre, while the masses lying beyond its influence continue to drift with the stream. Precisely analogous phenomena are presented by the cirri carried along by atmospheric currents in the higher regions. They are in the same way sucked down by the gyratory action of the whirlwind, giving rise in the lower regions to heavy rains, hail, and thunderstorms, while the more distant clouds continue to follow the general course of the wind.—Researches on the importance of consumptive patients breathing a pure air uncontaminated by pulmonary exhalations, by MM. Brown-Séquard and d'Arsonval. These remarks are made in connection with an apparatus submitted to the Academy, which has been constructed for the purpose of removing from bedrooms all the air exhaled by one or more persons. The importance is shown of thus purifying sick-rooms, hospital wards, &c., especially when occupied by patients suffering from affections of the lungs.—On a class of differential equations, by M. R. Liouville. Here are studied more especially the differential equations, amongst which are comprised all those of the geodetic lines.—Action of vanadic acid on the fluoride of potassium, by M. A. Ditte. It is shown that vanadic acid in combination with the fluoride of potassium yields compound substances more or less rich in fluoride. But in the presence of oxygen a certain quantity of potassa is developed, which forms vanadates with a part of the vanadic acid employed in the process.—Ammonical cyanides of zinc, by M. Raoul Varet. The chloride, bromide, and iodide of zinc combined with ammonia yield a relatively large number of compound substances. But with the cyanide of zinc, whatever be the conditions, the only substances obtained are $ZnCy,NH_3HO$ when the reaction takes place in the presence of water, and $ZnCy, NH_2$ in all other cases.—Application of a method of de Senarmont to the reproduction of celestine and anglesite by the wet process, by M. L. Bourgeois. The process by means of which de Senarmont obtained artificial crystals of barytine is here applied to the production of the allied minerals, celestine and anglesite.—On the importance of the nutritive function in determining the distinction between plants and animals amongst the lower organisms, by M. P. A. Dangeard. The Chytridineæ and the Chlamidomonadineæ, the two primary groups of the vegetable kingdom, are both connected below with the Flagellæ, branching off upwards one to the Algæ the other to the Fungus group. It is here shown that by the process of nutrition alone is it possible to determine the point where plant and animal become differentiated.—On the suckers of the Rhinantheæ and Santalaceæ, by M. Leclerc du Sablon. These hold an intermediate position between non-parasitic and true parasitic plants, drawing their nutriment both through their roots and through suckers from other plants. The present observations deal exclusively with the suckers and their various functions.—On the discovery of carboniferous formations with marine and vegetable fossils in the neighbourhood of Raon-sur Plaine, by M. Bleicher. The recent discovery of coal in this district supplies the connecting link between the carboniferous measures of the Bruche and Rabodeau valleys (Alsace and Lorraine).

BERLIN.

Physiological Society, November 4.—Prof. du Bois Reymond, President, in the chair.—Dr. Goldschneider spoke on the fact, which has been known for a long time, that when carbonic acid gas is allowed to come in contact with the skin it produces a greater sensation of warmth than air of the same temperature. He has carried out a prolonged series of experiments to determine the cause of this increased sensation of heat. He examined first the purely physical factors which might have some influence on the observed facts—namely, the moistness, specific heat, and heat-absorption by the gases. When he compared the sensation of heat produced by moist air with that produced by dry air, he found that the former always seemed the greater; the difference between the two might be as much as 5° C. to 6° C. when the air was at a higher temperature than that of the skin. Thus, air at 35° C. whose saturation with moisture was 80 produced the same sensation of heat as air at 41° C. whose saturation was only 30. When experimenting with carbonic acid gas he found that a difference of 40 in the saturation produced a difference in the resulting sensation of heat corresponding to 2° to 3° of temperature. But even when equally moist or dry air and carbonic acid gas were allowed to act on the skin the sensation of heat produced by the latter was always the greater. It does not seem possible to explain the greater sensation of heat with carbonic acid gas by reference to the extremely small differences of specific heat of air and this gas, still less by reference to their somewhat greater coefficients of heat absorption. He also investigated the effect of the more ready absorption of carbonic acid gas by fluids, by removing the epidermis with a blister on a circumscribed portion of the skin and allowing the gas to act upon this place. The carbonic acid gas was speedily absorbed by the lymph, but it still produced a sensation of greater heat even when all moisture was removed from the surface exposed by the blister. He hence considers that the purely physical properties of the gas will not suffice to explain its remarkable influence on the sensory nerves for heat. Dr. Goldschneider next investigated the physiological factors which might suffice to explain the observed phenomenon. He proved that there is no recognizable objective rise of temperature under the influence of the carbonic acid gas. It is true that he observed now and again a distinct dilatation of the blood-vessels, but this was by no means constant, and not sufficient to account for the increased sensation of heat. He proved however as has been observed by many physiologists, that the carbonic acid gas has a direct effect upon the sensory nerves; but in contrast to the results of others, who attribute an anæsthetic action to this gas, he observed that at first it produces a hyperæsthesia of those nerves specially connected with the production of heat sensations, and then this makes way for an anæsthesia. The nerves connected with heat sensations were more strongly stimulated than those connected with sensations of cold. The speaker summed up the results of his extremely numerous experiments by urging that in addition to the greater absorption of heat by the carbonic acid gas and its power of producing hyperæmia of the skin, its action is to be explained chiefly by its direct chemical action on the endings of the nerves concerned in the production of sensations of heat. This therefore is to be regarded as the cause of the observed phenomenon that when carbonic acid gas is brought into contact with the skin it produces a greater sensation of heat than does the contact of equally warm and equally dry air.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Thomas A. Edison and Samuel F. B. Morse: D. B. Denslow and J. M. Parker (Cassell).—Our Earth and its Story: Edited by Dr. R. Brown (Cassell).—Stigmaria Ficoides: W. E. Williamson (Palæontographical Society).—Index Catalogue of the Library of the Surgeon General's Office, United States Army, vol. viii. (Washington).—The Ethical Import of Darwinism: J. G. Schurman (Williams and Norgate).—A Manual of Orchidaceous Plants, Part 1, Odontoglossum; Part 2, Cattleya and Lœlia (Veitch).—Osservazioni e Studii dei Crepuscoli Rosei 1883-86: A. Riccò (Roma).—Journal of the College of Science, Imperial University, Japan, vol. i. Part 4 (Tokio).

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